

# The Systematics of the Charaxidae (Lepidoptera: Nymphalioidea)

By A. H. B. RYDON, F.R.E.S.

(Continued from p. 233)

## (1) Subfamily CHARAXINAE

Charaxidae (Doherty, 1886)

(Type-genus: *Charaxes* Ochsenheimer, 1886, *Schmett. Europa*, vol. 4, p. 18; type-species: *Papilio jasius* L., 1767.)

This subfamily comprises *Charaxes* and the closely allied Indo-Australian genus *Polyura*, the latter differing in having the cell of the hindwing open, whereas in the former it is closed. There are also differences in the male genitalia of the two groups, mainly in the formation of the juxta, which, in *Charaxes*, has the dorsal groove extending posteriorly into the basal part of the ventral hook, but in *Polyura* the hook is not grooved dorsally (see Rothschild and Jordan, 1898, pl. 14). The pattern of the wings of the two groups differs, too, as has been pointed out by the latter authors, i.e. in *Polyura* the cell of both wings never has more than two bars below, while in *Charaxes* four bars are typically present. The antennae of *Charaxes* are black at the tip in nearly all the species (but not in the *varanes-fulvescens* group in which the antennae are reddish-brown throughout their length), while in *Polyura* the last few segments of the antennae are usually rufous-brown in colour. Sexual dimorphism is common among *Charaxes*, but not *Polyura*.

*Charaxes* is a large genus, consisting of more than one hundred species in the Ethiopian region and some twenty-odd species in the Indo-Australian region, with one species (*Ch. jasius*) in the Mediterranean Subregion. The African members of this genus were subdivided by Aurivillius (1911) into 18 groups on the shape, colour and pattern of the wings. These groups are, to some extent, supported by differences in the early stages (e.g. in the larval head-pieces, the cremastral hooks of the pupae, and so on), in the foodplant preferences, and in the male genitalia. Poulton (1926) rearranged Aurivillius's groups, and divided them into *Leptodontiae* and *Hadrodontiae* (i.e. those with small serrations on the costa of the forewing, as opposed to those with large serrations). Some authors have already split *Charaxes* in a small way into separate genera. Moore (1880) created the genus *Haridra* for the large brown Indo-Australian *Charaxes* based on *Ch. psaphon* Westwood; Hemming (1939) erected the genus *Zingha* for *Ch. zingha* Stoll, as a replacement name for *Monura* Mabille; and Cowan (1968) coined the name *Stonehamia* for *Ch. varanes* (Cramer), to replace *Hadrodontes* Stoneham. If one is to split up *Charaxes* into separate genera, the genus *Eriboea* Hübner should be resurrected for the distinctive *etheocles-ethalion*

group of African *Charaxes*, with their black males and variegated, mimetic females. However, I myself do not think there is any real need for splitting up *Charaxes*, since the genus is an easily recognizable one, both in the early stages and in the morphology of the adults; nor, indeed, was such action advocated by Rothschild and Jordan (1898-1900) in their monograph of the genus. The same thing applies to the genus *Polyura*, which Moore (1896) divided into *Murwareda* (based on *Charaxes dolon* Westwood) for the larger members of the group, retaining the invalid name "*Eulepis*" for the rest. Although Rothschild and Jordan (1898) separated *Polyura* into three groups according to the development of the pattern of the wings, represented respectively by *pyrrhus*, *eudamippus* and *delphis*, they did not maintain Moore's genus *Murwareda*, as they considered the characters upon which it was based were completely unreliable. There are, nevertheless, differences in the male genitalia of the larger and the smaller species of *Polyura* that would justify splitting up the genus into subgenera if one felt so inclined. Using the following characters, the Charaxinae can be divided into two tribes:

- (1) Hindwing cell open; tip of antenna rufous-brown; ventral hook at distal end of juxta not grooved at its base .....  
tribe POLYURINI tribus n.

(Type-genus: *Polyura* Billberg, 1820, *Enum. Ins. Mus. Billb.*, p. 79; type-species: *Papilio pyrrhus* L., 1758.) This tribe also contains *Murwareda*. (*P. pyrrhus*, incidentally, was the first member of the Charaxidae to be named by Linnaeus.)

- (2) Hindwing cell closed; tip of antenna typically black; ventral hook at distal end of juxta dorsally grooved at its base ..... tribe CHARAXINI  
(Type-genus: *Charaxes* Ochs., 1816). This tribe also comprises *Haridra*, *Zingha*, *Stonehamia* and *Eriboea*.

(2) Subfamily EUXANTHINAE subfam. n.

(Type-genus: *Euxanthe* Hübner, 1819, *Verz. bekannt. Schmett.*, vol. 3, p. 39; type-species: *Papilio eurinome* Cramer, 1775.)

This Ethiopian subfamily comprises some seven-odd species, one of which, *Godartia madagascariensis* (Godart), occurs in the Malagasy Republic. They are large butterflies with rounded, entire wings, the pattern of which superficially resembles that of certain African Danaids. Their flight is slow and somewhat undulating, with much flapping of the wings, although they possess a considerable turn of speed if molested. They are woodland butterflies, and have much the same feeding habits as *Charaxes*, the males also having favourite perches to which they will return day after day. If two males share the same territory they will be seen performing an aerial *pas de deux* for hours on end, whether in fight or in play it is difficult to say. *Hypomelaena tiberius*, being a shade lover, is found only in the depths of forests. (On one occasion I disturbed a "dormitory" of a dozen or so

males of the latter species resting head downwards on saplings in the heat of the day in the depths of a forest on the Kenya coast.) Schultze (1920, pp. 570-571) considered *Euxanthe*, like the Danaids, to be distasteful, their similarity to the latter being a convergence phenomenon (Konvergenzerscheinung).

The Euxanthinae can be divided into two separate groups, centred around the dark *trajanus-tiberius* species on the one hand, and the lighter *eurinome-madagascariensis* ones on the other. For the former group Aurivillius erected the subgenus *Hypomelaena* in 1899, because they differ from the latter group in having the cell of the forewing almost triangular, with the anterior and the posterior sides of the cell being nearly equal in length, and the cell of the hindwing closed; while in the *eurinome-madagascariensis* group the cell of the forewing is obtusely rounded anteriorly, and that of the hindwing is open. In *tiberius* and *trajanus* the forewing has a red-brown patch in the cell, which is not found in the members of the other group. The forewing cell, incidentally, in *tiberius* differs from that of *trajanus* in having the lower discocellular vein markedly convex proximad; furthermore, in *tiberius* the subcostal veins of the forewing run free, but in *trajanus* the first subcostal vein (V.11) anastomoses with the costal vein (V. 12). In the *eurinome* group the first and second subcostal veins (Vs.11, 10) anastomose with the costal vein, the second vein (V. 10) cutting through the costal vein to enter the costa of the wing basad of it. In *Godartia madagascariensis* the first subcostal vein (V.11) is absent), the second (V.10) running free to the costa. In the male genitalia there are also differences in the two main groups, the aedeagus, for example, being shorter in *tiberius* and *trajanus* (between 8-9 mm. in length) than in the *eurinome* group, in which it is between 10-12 mm long. In *tiberius* the saccus is relatively short and pointed, while in *madagascariensis* and *eurinome* it is larger and bluntly produced anteriorly. The Euxanthinae differ among themselves in the early stages too, the larvae of *tiberius* and *trajanus* having the lower pair of cephalic horns pointed at their extremity, while in the *eurinome* group the horns terminate in a club (see van Someren and Rogers, 1927, pl. 41). This subfamily can be divided into two tribes, as shown in the key below:

- (1) Forewing without red-brown discal patch; forewing cell dome-shaped; hindwing cell open; aedeagus from 10-12 mm. in length; the lower pair of horns on the head of larva clubbed at the tip ..... tribe EUXANTHINI *tribus n.*  
(Type-genus: *Euxanthe* Hübner, 1819).  
Also contains *Godartia* Lucas.
- (2) Forewing with red-brown discal patch; forewing cell somewhat triangular in shape; hind-wing cell closed; aedeagus relatively short, between 8-9 mm. long; lower pair of horns on head of larva pointed at the end .....  
tribe HYPOMELAENINI *tribus n.*  
(Type-genus: *Hypomelaena* Aurivillius, 1899, "Rhopal-

ocera Aethiopica", *K. svenska Vetensk Akad. Handl.*, Stockholm, vol. 31 (No. 5), p. 220; type-species: *Godartia trajanus* Ward, 1871.)

(3) Subfamily PALLINAE *subfam. n.*

Type-genus: *Palla* Hübner, 1819, *Verz. bekannt. Schmett.*, vol. 3, p. 47; type-species *Papilio decius* Cramer, 1777.)

The African genus *Palla* differs from *Charaxes* not only in the early stages, as already described above, but also in the morphology of the adults. The scheme of markings of the wings, especially on the underside, differs from that of *Charaxes*, as has been pointed out by Aurivillius (1911-12). The male genitalia are quite unlike those of *Charaxes* or *Euxanthe*, in that the aedeagus is relatively short and is spiny throughout its length, and the valves are short and somewhat rectangular in shape, with a ventral hook at the apex. The vinculum is wide and heavily sclerotized. The male and female genitalia of *Palla decius* have been figured by Rothschild and Jordan (1898, pl. 14). The specialized triangular scales, as already stated above, are delimited by vein 1, and do not extend into space 1b (see Rothschild and Jordan, 1898, pl. 13, fig. 12). This subfamily consists of only one tribe, namely Pallini *tribus n.* (Type-genus: *Palla* Hübner). The genus contains five or six species.

(4) Subfamily PROTHOINAE *subfam. n.*

(Type-genus: *Prothoe* Hübner, 1824, *Samml. exot. Schmett.*, vol. 2, pl. 54; type-species: *Nymphalis franck* Godart, 1824 (not *franckii* Hübner, 1824).)

The species comprising this Oriental subfamily were placed among the Charaxidae by Schatz and Röber in 1892, although Herrich-Schäffer (1864) had separated them from the "*Proto-gonius-Agrias*" group of his family "Nymphalina" because of the open cell in the hindwing, and because the hindwing was bluntly produced between veins 3 and 4. Semper (1886-92) placed the genus in his "*Pseudo-Nymphalis*" group, just before *Charaxes*; and Moore (1899, pp. 127, 128) placed the genus in the Nymphalinae between *Symbrenthia* (which it mimics on the underside) and *Rhinopalpa*. Moore erected the genus *Agatasa* for the larger, more robust species, as typified by *Nymphalis calydonia* Hewitson. As already noted, the basal sensory patch of the palps of *Prothoe* and *Agatasa* is distinctive, being proximally placed on the basal segment, and is wide, short, and somewhat oblong in shape, being in appearance nearer to *Polygrapha* (a genus of the Anaeinae) than to any other member of the Charaxidae. According to Moore (1899), and Fruhstorfer (1913-4), the species comprising the Prothoïnae have much the same kind of habits in the field as *Charaxes*. Fruhstorfer also said, "The genus *Prothoe* is, in the frequently most gorgeous colouring of the under surface, related to *Charaxes* in the same way as *Agrias* is to *Prepona*". Schatz and Röber (1892) stated that the Prothoïnae can be

divided on the shape, pattern, and venation of the wings into three groups based respectively on *calydonia*, *franck* and *australis*. Fruhstorfer (*l.c.*), however, divided them into two groups according to the shape of the lower discocellular vein of the forewing, which is obtusely bent proximad in *Prothoe* but is almost straight in *Agatasa*. Fruhstorfer's subdivision is borne out by the configuration of the male genitalia, in that the genital armature of *Agatasa* (see fig. 35) is altogether much larger than that of *Prothoe* (fig. 36), the valve of the former being elongate, with a lower and an upper spiny projection on its inner surface, and is, as Fruhstorfer noted, somewhat Limenitoid in shape; while the valve of *Prothoe* is rounded and terminally spiked, without any projections on the inside. *Prothoe* also differs from *Agatasa* in having a hair-tuft in the hindwing of the males, such as is found in *Prepona* and *Agrias* (q.v.). For these various reasons the Prothoïnae can be subdivided into two tribes, using the following key:

- (1) Veins 7 and 8 of forewing short-stalked; lower discocellular vein nearly straight; hindwing without a hair-tuft in the males; adults large and robust, with the wings chiefly creamy-white above ..... tribe AGATASINI *tribus n.*  
(Type-genus: *Agatasa* Moore, 1899, *Lep. Ind.*, vol. 4, p. 127; type-species: *Nymphalis calydonia* Hewitson, 1855.) This tribe also includes *A. chrysodonia* (Staudinger).
- (2) Veins 7 and 8 of forewing longer-stalked than in *Agatasa*; the lower discocellular vein obtusely bent proximad; hindwing with a hair-tuft in the males; adults not so large or robust as in the Agatasini, with a dark ground colour on the upperside of the wings, and typically with a pale blue postdiscal band in the forewing .....  
tribe PROTHOINI *tribus n.*  
(Type-genus: *Prothoe* Hubner, 1824). This tribe contains those species centred around *franck*, *australis* Guér., *ribbei* Gr. Sm. and *regalis* Butl. respectively.